

CLAIMS

We claim:

1. A non-naturally occurring GPA protein comprising at least five amino acid substitutions as compared to hG-CSF protein, wherein said substitutions are selected amino acid residues at the following positions: 14, 17, 20, 21, 24, 27, 28, 31, 32, 34, 35, 38, 78, 79, 82, 85, 89, 91, 92, 99, 102, 103, 106, 107, 109, 110, 113, 116, 120, 117, 145, 146, 147, 148, 151, 153, 155, 156, 157, 160, 161, 164, 167, 168, and 170.  
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2. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 17, 21, 24, 28, 31, 78, 85, 89, 103, 110, 113, 151, 153, 157, 160, 161, and 168.
3. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 10 17, 21, 24, 28, 31, 78, 82, 85, 89, 103, 106, 110, 113, 151, 153, 157, 160, 161, 167, and 168.
4. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 17, 21, 24, 28, 31, 35, 78, 82, 85, 89, 92, 103, 106, 110, 113, 117, 151, 153, 157, 160, 161, and 168.
5. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 14, 20, 27, 32, 34, 38, 79, 91, 99, 102, 107, 109, 116, 120, 145, 146, 147, 148, 155, 156, 164, and 170.
- 15 6. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 14, 20, 27, 32, 34, 38, 145, 146, 147, 148, 155, 156, 164, and 170.
7. A non-naturally occurring GPA protein comprising at least two amino acid substitutions as compared to hG-CSF protein, wherein all of said substitutions are in the core region.
8. A non-naturally occurring GPA protein according to claim 7 wherein said substitutions are selected from 20 17, 28, 78, 85, 89, 92, 103, 110, 113, 151, 153, and 168.
9. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17A, 28A, and 110I (SEQ ID NO: 19).

10. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17L, 28A, 78F, 85F, 151I, 153I, and 168F (SEQ ID NO: 20).

11. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17L, 28A, 78F, 85F, and 168F (SEQ ID NO: 21).

5 12. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17A, 28A, 89F, 92F, 103V, and 110I (SEQ ID NO: 22).

13. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17A, 28A, 89F, and 92F (SEQ ID NO: 23).

10 14. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are 17A and 28A (SEQ ID NO:10).

15. A non-naturally occurring GPA protein according to claim 1 wherein said substitutions are selected from 17L, 28A, 78F, 85F, 113L, 151I and 153I (SEQ ID NO:24).

16. A recombinant nucleic acid encoding the non-naturally occurring GPA protein of claim 1.

15 17. A pharmaceutical composition comprising a GPA protein according to claim 1 and a pharmaceutical carrier.